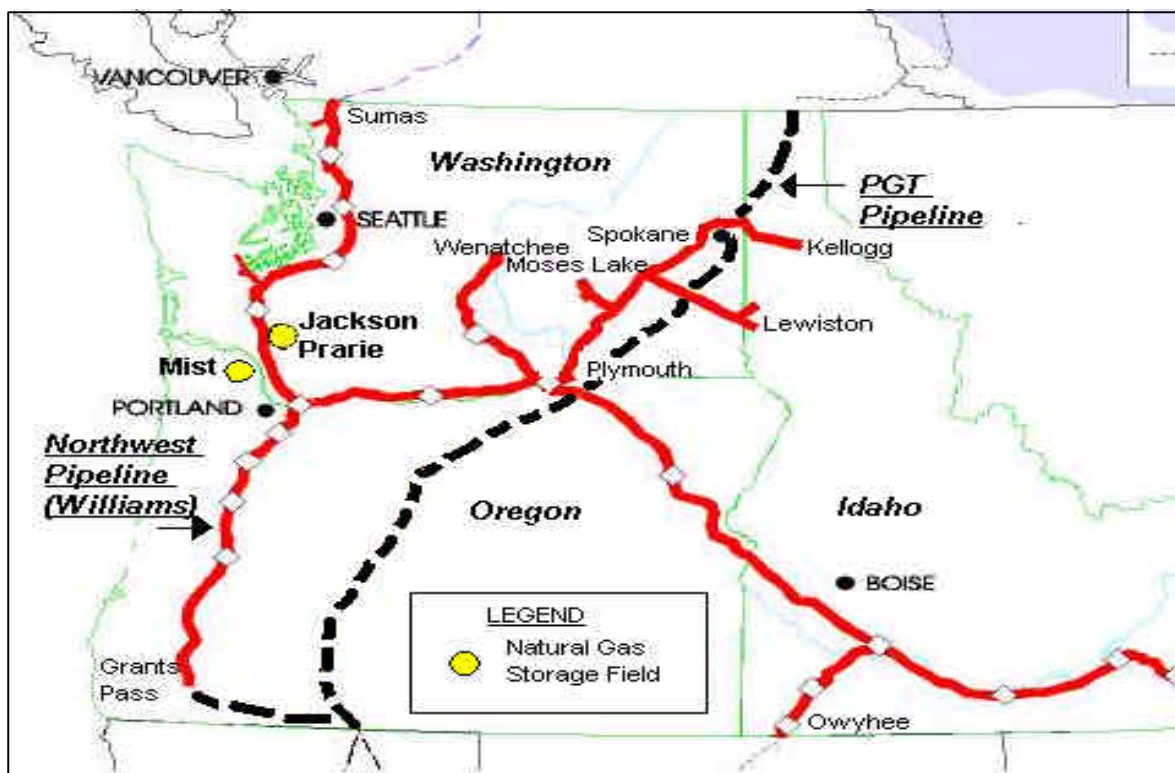


Natural gas is an increasingly important part of the state's energy mix. Prior to the construction of the Northwest Pipeline in 1957, natural gas was unavailable in the Northwest, although the major urban centers were served with manufactured gas made from coal or oil. Initially, the pipeline and local distribution utilities served primarily industrial process heat loads in the forest products industry. In the 1980's, as home heating oil felt the impact of the oil embargoes, and electric prices increased with the addition of coal and nuclear generating resources, natural gas became the fuel of choice in the residential sector. Today approximately half of the homes in the state use natural gas for heating. In the 1990's, a rapid increase in the use of natural gas to generate electricity led to a sharp increase in state natural gas demand.

Williams Pipeline Company operates the Northwest Pipeline which brings supplies from the Canadian border near Sumas into Washington and exits the state at two locations: south at Vancouver and east at Plymouth. Pacific Gas Transmission brings gas from Alberta into eastern Washington and exits the state near Pasco en route to California. The two pipelines interconnect just below the Washington border near Hermiston, Oregon and gas from either can be delivered to any point in the state where gas service is available. In addition, three connections exist at the Canadian border near Sumas, providing gas from the Canadian system to the Cherry Point industrial area near Bellingham, to the Sumas Energy electric generating plant, and to Cascade Natural Gas.

Washington is served by two interstate natural gas pipelines and seven natural gas distribution utilities. See Figure 13, Washington Natural Gas Pipeline Infrastructure.



**Figure 13 Washington Natural Gas Pipeline Infrastructure**

Source: Natural Gas Industry Maps

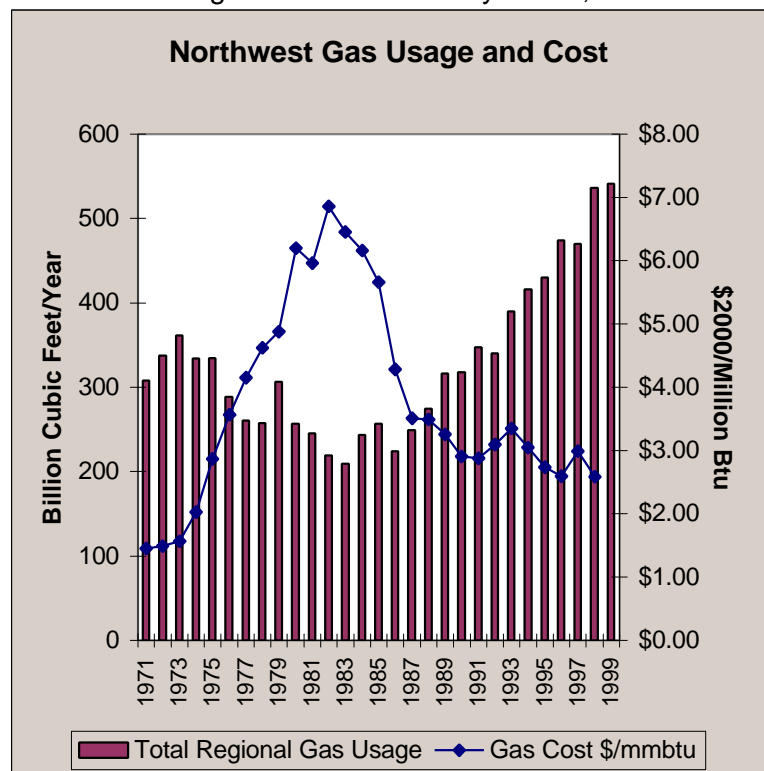
The four investor-owned natural gas utilities serve nearly all of the natural gas consumers in the state. Avista Utilities (formerly Washington Water Power) serves the Spokane and Pullman area. Northwest Natural Gas serves the Vancouver region. Puget Sound Energy (formerly Washington Natural Gas) serves King, Pierce, Snohomish, Thurston, and Kittitas counties. Cascade Natural Gas serves pockets of customers in many areas of the state, including Wenatchee, Yakima, Walla Walla, Tri-Cities, Bellingham, Mt. Vernon, Anacortes, Bremerton, Aberdeen, and Shelton. In addition, small natural gas distribution systems are operated by the City of Ellensburg and the towns of Enumclaw, and Buckley.<sup>1</sup>

## PRICE INCREASES

Historically, gas prices have tracked oil prices, and gas demand has responded to changes in prices. In the 1970's, rising prices led to falling demand as industries learned to squeeze more productivity out of their gas consumption. In the 1980's, declining gas prices coupled with rising electric prices led to a surge in the use of natural gas for home heating, and gas sales went up sharply. Figure 14 shows regional natural gas consumption, measured on the left axis, and real (inflation adjusted) gas prices measured on the right axis: During the summer and fall of 2000, wholesale natural gas prices in the Pacific Northwest more than tripled, compared with the previous year. This led to retail rate increases of approximately 50% to residential and commercial customers of Washington's natural gas utilities. In early December 2000, daily spot market prices for natural gas spiked to as much as \$30 per million Btu<sup>2</sup>, some twenty times the price two years earlier, and ten times the price

reached just six months earlier. Annual contract prices also soared, from less than \$2 per million Btu to as much as \$6 per million Btu.<sup>3</sup> The short and long-term impact that this surge in prices will have on gas usage has not yet been measured. This sudden increase in price is explained by a combination of factors. First and foremost, the natural gas industry has gone from a position of surplus, with "glutted" markets, to a position of relative balance between supply and demand. The Northwest no longer enjoys a "buyers market" for natural gas because of growth in gas demand within the region, growth in demand outside the region, and construction of a new pipeline to the Midwest.

Second, oil prices surged during 2000 as the global economy recovered without a commensurate increase in oil production. The linkage between natural gas and oil prices is due to the fact that for many applications, particularly industrial fuel supply and petrochemical and plastics manufacturing, oil and gas are substitute fuels. When the gas industry was in surplus, from 1995 - 99, this linkage became relatively weak, but as the



**Figure 14 Northwest Natural Gas Usage and Cost**

Source: Energy Information Administration, Bureau of Labor Statistics

industry came into balance, fuel substitution became relevant.

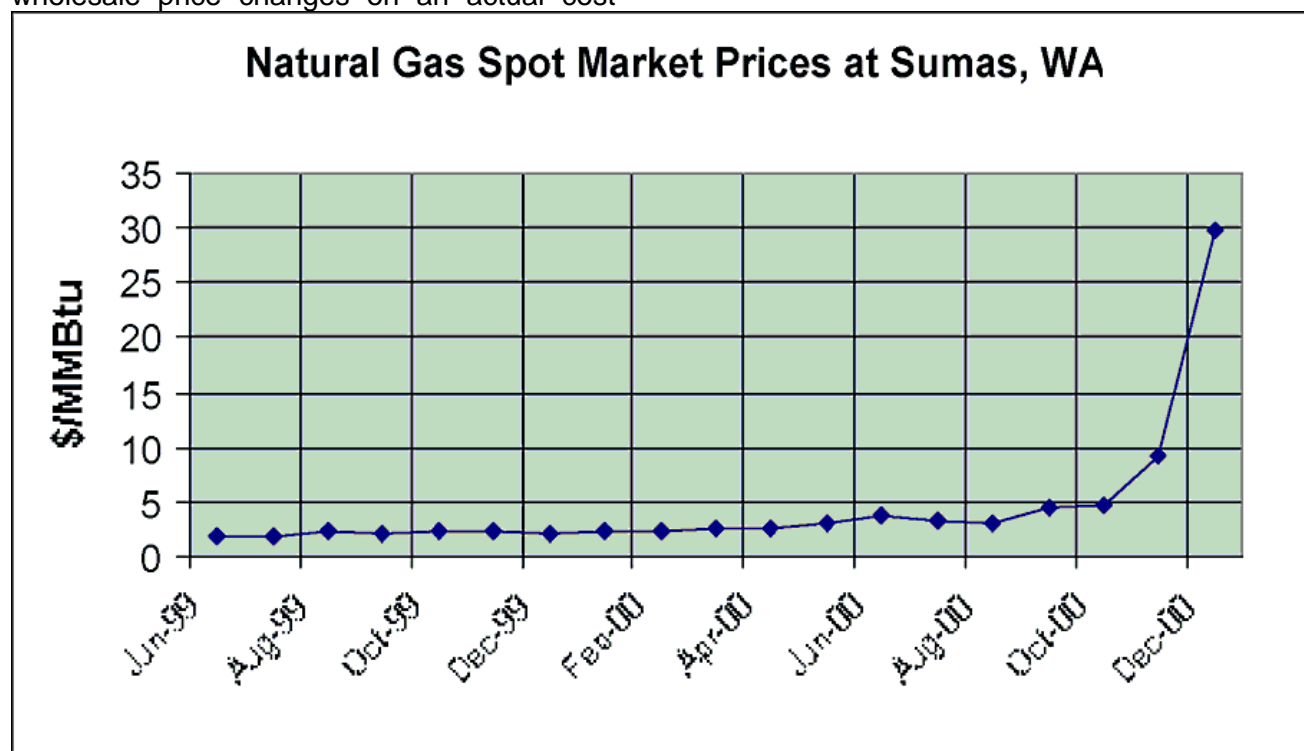
Finally, electric load growth on the West

Coast, combined with relatively dry hydroelectric conditions has led to much greater reliance on natural gas for electric generation in 2000 than in recent years. The large magnitude and sudden change in gas demand has resulted in sharp short-term increases in gas price.

The wholesale natural gas market is unregulated, and prices move on a daily basis as buyers and sellers negotiate transactions. There are no constraints on price by either the U.S. or Canadian government. The Washington Utilities and Transportation Commission has historically allowed local gas distribution utilities to pass through any wholesale price changes on an actual cost

basis. This policy led to a price increase of 50% and more during the summer and fall of 2000. Figure 15 shows wholesale natural gas prices at the Washington/British Columbia border over the past year and a half; the spike in prices in December 2000, caused by increased demand for natural gas for electric generation coupled with cold weather in California and the Northwest, is extraordinary and unprecedented.

Table 6 shows the average residential natural gas rates in effect for Washington's four investor-owned gas utilities on January 1, 1999, January 1, 2000, and November 1, 2000.



**Figure 15 Natural Gas Spot Market Prices at Sumas, WA**

Source: Natural Gas Weekly

IOU Gas Utility	January 1, 1999	January 1, 2000	November 1, 2000
Puget Sound Energy	.489	.570	.737
Avista Utilities	.379	.430	.594
Cascade Natural Gas	.568	.625	.700
Northwest Natural Gas	.510	.575	.715

**Table 6 Residential Gas Prices, dollars per therm**

Source: Washington Utilities and Transportation Commission

## Demand for Gas has Increased

The demand for natural gas has increased sharply in recent years. This is one reason why prices have increased. The first reason for the increase in demand is a large number of new natural gas fueled electric generating facilities have been constructed and connected to the natural gas pipelines which serve the state. Second, gas is almost the universal choice of new home buyers for space and water heating where gas distribution service is available, and residential gas consumption has grown at more than twice the rate of the state's population. Finally, until the summer of 2000, gas prices had declined sharply in inflation-adjusted terms. Figure 14 shows both the demands for gas in the Northwest and bulk gas prices.

The biggest change in natural gas usage has been for electric generation. The use of natural gas for electrical generation is a relatively new phenomenon in the Pacific Northwest. Prior to 1990, a number of gas-fired power plants were constructed, but these were typically used only for meeting peak demand during a few of the coldest days of the year. Beginning in 1991, several power plants were built at industrial facilities, producing both process heat for the industries and electricity in a process known as "cogeneration." Since 1996, stand-alone gas-fired electric generating plants have been installed in several locations in and near the state, and many more are proposed for construction.

Name	Location	Date	Size (MW)	Type
March Point 1 & 2	Anacortes	1991	140	Cogeneration
Encogen 1, 2 & 3	Bellingham	1993	160	Cogeneration
Sumas I	Sumas	1993	125	Cogeneration
Tenaska I	Ferndale	1994	245	Cogeneration
Rathdrum 1 & 2	Idaho, near Spokane	1995	176	Cogeneration
Hermiston 1 & 2	Oregon, near Pasco	1996	469	Cogeneration
River Road	Vancouver	1997	248	Combined Cycle
Coyote Springs	Oregon, near Pasco	1997	237	Cogeneration

**Table 7 Northwest Natural Gas Power Plant Additions, 1991 - Present**

Source: Northwest Power Planning Council

Residential and commercial use of natural gas is expected to continue to increase. The demand forecasts of the state's natural gas utilities project annual increases in gas usage of 2% - 4%<sup>4</sup>. This growth is expected to be served primarily by increasing utilization of existing pipelines, and activation of additional natural gas storage fields at Jackson Prairie (south of Chehalis) and at the Mist, Oregon storage field owned by Northwest Natural Gas Company.

Future growth in natural gas demand will be heavily affected by decisions to build additional natural gas fired power plants, and the magnitude and timing of this is highly uncertain. The Washington Energy Facility Site Evaluation Council (EFSEC) has approved four new gas fired power plants, and is considering applications for up to four more. In addition, several plants which are smaller than the 250 megawatt EFSEC threshold are currently proposed for construction. Table 8 lists approved or active power plant proposals which would use the pipeline system serving this state:

Name	Location	Size (mw)	Status
<b><i>Under Construction</i></b>			
Rathdrum II	Rathdrum, ID	270	Under Construction, Operation in 2001
Hermiston II	Hermiston, OR	536	Under Construction, Operation in Summer 2000
Klamath Falls	Klamath Falls, OR	484	Under Construction, Operation in Summer 2002
<b><i>Approved for Construction</i></b>			
CGF	Chehalis, WA	520	Approved by EFSEC (*)
Weyerhaeuser	Longview, WA	405	Approved by EFSEC
Energy Northwest	Satsop, WA	532	Approved by EFSEC
NRPF	Creston, WA	838	Approved by EFSEC
Delta	Everett, WA	249	Approved by local authorities
<b><i>In Licensing Process</i></b>			
Sumas II	Sumas, WA	660	EFSEC decision due
Starbuck	Starbuck, WA	1100	EFSEC potential Site Study underway
Newport	Wallula, WA	1300	EFSEC potential Site Study underway
Mercer Ranch	Kennewick, WA	850	EFSEC potential Site Study underway

**Table 8 New Natural Gas Power Plants**

(\*) Amendment Pending

Source: Northwest Power Planning Council

To put this into some perspective, if the five plants already approved for construction were built, natural gas consumption in the state would increase by approximately 70%. If only two of the four plants in the EFSEC licensing process" were built as well, natural gas consumption would double. There is no certainty that the natural gas pipeline infrastructure could accommodate all of these plants being built, and it would be speculative to predict the impact on the reliability of supply of natural gas or the price of natural gas were these plants to be built.

If a significant number of new power plants are constructed, there will be substantial pressure on both the supply of natural gas and the capacity of natural gas pipelines connecting the Northwest to the sources of gas supply. A separate report on this subject is anticipated to be published by the OTED Energy Division in early 2001.

## Pipeline Capacity

Washington has no natural gas production within its borders. Our natural gas comes from the Rocky Mountain region of the U.S. and from Alberta and British Columbia. Each of the three points of entry has operated at or near capacity in recent years, but the capacity of the pipelines is being periodically upgraded to meet new demand. Pipeline upgrades take two forms. Additional compression capacity can move increased amounts of gas within the existing pipe or when that capacity is exhausted parallel pipelines must be constructed. The former can usually be done economically and quickly, while the latter is time consuming and expensive.

Because these three pipelines serve more than just the state of Washington, it is important to refer to their capacity in regional terms. Pacific Gas and Electric Company, Gas Transmission Northwest (PGT) serves Idaho, Washington, Oregon, and California, and the majority of its capacity is committed to California. Northwest Pipeline serves

Washington, Oregon, and Idaho. It connects at Sumas to West Coast Pipeline, a Canadian line that also provides service to all of British Columbia.

PGT has a huge capacity at the Canadian border, some 2.8 billion cubic feet per day, but over two-thirds of this is committed to California customers. The amount available to serve the state of Washington is similar to that of Northwest Pipeline's southern system. If the Creston, Starbuck, or Wallula power stations were built, the capacity of PGT would need to be augmented.

Northwest Pipeline's southern system brings Rocky Mountain gas to the state, entering the state near Pasco. This is the smallest of the three pipelines serving the state, able to carry approximately 400 million cubic feet per day, or about 20% of the region's daily usage. This line has not been upgraded in recent years, largely because the domestic gas has not been price-competitive with western Canadian gas. The recent opening of the Alliance Pipeline from Alberta to Chicago has provided a new outlet for Canadian gas, and the price differential between the Northwest and the Midwest has evaporated. In fact, under current conditions, with high levels of natural gas use in California and the Northwest for electric generation, pipeline capacity constraints have led to short-term sharp increases in natural gas prices in the West Coast market.

Northwest Pipeline's northern system, connecting to West Coast Pipeline at Sumas, is the largest source of gas for the state. This linkage is operating very close to capacity at the current time. Two upgrades to the capacity of West Coast have been designed; together they would increase capacity by about 300 million cubic feet per day. One-third of that upgrade is needed to serve core-market growth (residential and commercial) while two-thirds is available to meet increased demand for gas from electric generating plants. That amount of capacity is approximately half of what would be required if all of the gas-fired generating plants currently approved for construction in Western Washington were built. West Coast has no immediate plans for additional capacity,

because it does not believe that very many new generating plants will be built.

## Summary

The natural gas industry in the Pacific Northwest has undergone a dramatic transformation in the 43 years since the Northwest Pipeline was constructed. Initially serving primarily industrial loads, the gas industry now serves half of the homes in the state. Rapid growth in gas demand for electric generation has led to supply/demand imbalance, and (at least temporarily) soaring wholesale costs for natural gas. If the gas industry is able to respond to this increased demand with new supplies and additional pipeline capacity, gas prices may moderate in the future. If supply and pipeline capacity is outstripped by new gas demand, however, high prices could be with us for a long time to come. The dramatic price surge in the winter of 2000 - 2001 may be just the beginning of a new era in gas scarcity and price, or it may be a temporary condition caused by a rare combination of weather and economic conditions.

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<sup>1</sup> Additional information, including service area maps, is available at the Northwest Gas Association website: <http://www.nwga.org>

<sup>2</sup> Wholesale gas is traded in units of 1 MMBtu, or million British thermal units. Retail rates for gas utilities are per "therm." A therm is 100,000 BTUs, or one-tenth of the size of the wholesale units. A Btu is the amount of heat needed to raise one pound of water one degree Fahrenheit. A typical home heated with natural gas uses 800 therms (80 million Btu) per year.

<sup>3</sup> Source: Reuters Commodities: [www.commods.reuters.com](http://www.commods.reuters.com)

<sup>4</sup> Source: Least Cost Plans filed with the Washington Utilities and Transportation Commission by Puget Sound Energy, Avista, Cascade, and Northwest Natural Gas Companies.